FP094-30 Foundation Mathematics and Statistics for Physics and Engineering

26/27

Department
Warwick Global Academy
Level
Foundation
Module leader
David Tapp
Credit value
30
Module duration
25 weeks
Assessment
50% coursework, 50% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module develops the mathematical and statistical skills required to analyse problems in scientific and engineering contexts. Students will strengthen their understanding of core mathematical processes and learn how to apply algebraic tools and statistical models to a range of real-world examples. The module is designed to build both confidence and fluency in using mathematics as a problem-solving tool, laying the groundwork for more advanced study in science and engineering disciplines. By the end of the module, students will be able to select and apply appropriate mathematical and statistical methods to analyse and solve problems across science and engineering.

Module web page

Module aims

Students will develop understanding of mathematical processes so as to become confident in their use and application. By the end of the module, they will be able to apply mathematical and statistical knowledge, selecting appropriate algebraic tools and statistical models where necessary, to problems set in a variety of scientific and engineering contexts.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Algebra: Functions, Quadratics, Inequalities, Graphing standard functions, Exponential and Logarithmic functions, Binomial Theorem, Polynomial factorisation, Partial fractions, Sequence & Series, Trigonometry, Complex numbers, Matrices and Vectors, Numerical Methods for solving equations.

Calculus: Differentiation, Applications of derivatives, Higher order derivatives, Maclaurin's series expansions, Integration, Applications of integration in area and volume, First Order Differential Equations and their applications.

Statistics & Probability: Data representation, Correlation and Regression, Probability, Probability distributions.

Learning outcomes

By the end of the module, students should be able to:

- Apply mathematical and statistical knowledge to solve a variety of mathematical and real-world problems taken from scientific and engineering contexts, selecting appropriate algebraic tools and statistical models where necessary, implementing them precisely and rigorously to arrive at correct numerical or algebraic results and utilising technology effectively to simplify calculations.
- Undertake basic analysis of data by calculating summary statistics and representing data graphically, understanding the suitability and limitations of different statistical measures and graph types, interpreting the meaning of calculated results within a given context and using them to inform decision-making.
- Use fundamental principles of probability to quantify uncertainty and solve problems involving a selection of discrete and continuous probability distributions.
- Present written mathematical and statistical work clearly and logically.

Indicative reading list

Reading lists can be found in Talis

Interdisciplinary

Students will have opportunities to draw on knowledge and skills acquired within the different modules on their pathway.

International

All students are international, representing a wide range of cultural, linguistic, and educational

backgrounds. They bring diverse experiences and perspectives, enriching discussion and supporting the development of intercultural awareness. Examples for analysis and evaluation are drawn from a variety of countries, ensuring that teaching and learning are embedded in an international context.

Subject specific skills

- Apply core mathematical techniques in algebra, calculus, geometry, and statistics to solve scientific and engineering problems.
- Construct and manipulate mathematical models to represent physical systems and processes.
- Interpret and analyze quantitative data using appropriate mathematical and statistical tools.

Transferable skills

- Numeracy: Confidently handle complex calculations, symbolic manipulation, and quantitative reasoning
- Logical Reasoning: Develop and follow logical arguments through abstract and applied problems
- Problem-Solving: Apply structured approaches to tackle quantitative and real-world challenges
- Analytical Thinking: Interpret data, identify relationships, and evaluate mathematical models
- Data Interpretation: Analyze, represent, and draw conclusions from statistical data

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Study

Study time

Type	Required
Lectures	5 sessions of 1 hour (2%)
Seminars	25 sessions of 4 hours (33%)
Online learning (independent)	8 sessions of 1 hour (3%)
Private study	127 hours (42%)
Assessment	60 hours (20%)
Total	300 hours

Private study description

Extra class reading of books and learning materials on Moodle in preparation for seminars. Weekly worksheets. Flipped learning including pre-recorded videos.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group C

	Weighting	Study time	Eligible for self-certification
Assessment component			
In-Class Test 1	25%	15 hours	No

Term 1 Theory Test Relevant formulae will be provided within the questions/Formula sheet will be provided.
Only university approved calculators are permitted in this examination.

Reassessment component is the same

	Weighting	Study time	Eligible for self-certification
Assessment component			
In-Class Test 2	25%	15 hours	No

A closed book in class test testing material covered studied to this point and not covered by class test 1

Reassessment component is the same

	Weighting	Study time	Eligible for self-certification
Assessment component			
Final Examination	50%	30 hours	No

Formula sheet will be provided.
Only university approved calculators are permitted in this examination.

- Answerbook Gold (24 page)
- Students may use a calculator

	Weighting	Study time	Eligible for self-certification
Reassessment component is the same			

Feedback on assessment

Feeback on Tabula

Past exam papers for FP094

Availability

There is currently no information about the courses for which this module is core or optional.